CEREALS

Rice (*Oryza sativa*)
Normal *Ahu* (Autumn rice) (Direct seeded)

Varieties:

Varieties	Year of release	*Agro-climatic zone	Duration (days)	Av. Plant height (cm)
A. **Semidwarf				
Govind	-	U,C,L,B,H	105-100	95
***IR-50	-	U,C,L,B,H	105-110	85
Rasi	-	N,U,L,H	110-115	90
IR-36	1982	N,C,L,H	110-120	85
B. Tall				
Banglami	-	N,L	115-120	100-140
Rangadoria	-	N,C,L	115-120	-do-
Ahu Joha	-	N,U,L	110-120	-do-
Maibee	-	H	90-100	-do-
Dimrou	-	H	90-100	-do-

* Refer to page iii for full forms of agro-climatic zones

** Durations of semi-dwarf varieties are based on experiments conducted at Titabar. Durations of tall varieties are collected from the Field Trial Stations of respective zones.

*** Not recommended for blast endemic areas.

Varieties recommended (for direct seeded, rainfed upland/*Jhum* land situations of Hills Zone only):

Variety	Year of release	Sowing time	Duration (days)	Fertilizer (N:P:K) dose (kg/ha)	Grain Yield (t/ha)	Reaction to insect pests & diseases
Maizubiron	-	April-May	115	20:10:10	2.7	Moderately resistant to blast and BLB and durable field resistance to stem borer, leaf folder, case worm and rice bug
Inglongkiri	2017	-do-	110	-do-	3.4	Resistant to blast and moderately resistant to stem borer, case worm and leaf folder
Dehangi	2017	-do-	115	-do-	3.3	-do-

Rongkhang	2017	-do-	115	-do-	3.3	-do-
Haccha	-	-do-	115	-do-	3.5	Moderately resistant to Leaf blast, Neck blast, Brown spot, Sheath rot, Stem borer, Leaf folder, Plant hopper under natural condition

Land selection:

Areas having surface soil with medium to sandy texture overlying a silty clayey subsoil should preferably be selected.

Seed Selection:

Put the seeds in plain water and stir well. Select the sunken seeds rejecting the floating ones.

Sowing Time:

Seeds should be sown in March and April

Dry Seed Treatment:

Put seeds in a container and add any of the following fungicides according to the recommendation. Mix the fungicide thoroughly with seeds by agitating them for five minutes.

Fungicide	**Dose (g/kg seed)**
Carboxin	2.0

Field Preparation:

Prepare the land by 3 to 4 ploughings followed by laddering. Laddering is to be done properly to retain water uniformly in the field. FYM should be applied during initial field preparation.

Manures and fertilizers:

Compost or FYM @ 10 t/ha or 15 q/bigha should be applied.

Nutrient	**Requirement (kg/ha)**	**Form**	**Fertilizer requirement**	
			kg/ha	**kg/bigha**
A. Semidwarf varieties				
N	40	Urea	88	12
P_2O_5	20	SSP	125	17
K_2O	20	MOP	32	4
B. Tall varieties				
N	20	Urea	44	6
P_2O_5	10	SSP	62	9
K_2O	10	MOP	17	3

Nutrient recommendation for semi-dwarf varieties is 30 : 30 : 20 kg/ha N, P_2O_5, K_2O in the North Bank Plain Zone. Granulated mixed fertilizer at appropriate doses can also be applied.

Diammonium phosphate (DAP) in combination with rock phosphate or alone at the recommended level of nutrients (40 : 20 : 20) can be applied as a substitute for SSP and MRP or their combinations as an economic source of phosphate. For Hill Zone reduction of 50% chemical fertilizer by incorporating 10 t of FYM/ha is recommended.

Time of Application of Fertilizers:

1. Apply a full dose of phosphatic fertilizer at the time of final ploughing.
2. Apply half of nitrogenous and half of potassic fertilizer 15-25 days after germination or after first weeding.
3. The second top dressing with the remaining N and K_2O is to be done 40-50 days after germination or after the second weeding.

Seed Rate:

- **Line Sowing**: Sow seeds in lines with inter-row spacing of 20 cm @ 75 kg/ha (10-12 kg/ bigha)
- **Broadcasting**: Sow seeds @ 105-110 kg/ha (14 kg/bigha).

Interculture:

1. For weeding, use preferably wheel hoe or dry land weeder or *bindha* for laddering after 2 to 3 weeks from sowing. The second weeding should be done with wheel hoe or dry land weeder at 4-5 weeks from sowing. If wheel hoe or dry land weeder is not available, give manual weeding. Weeding should precede fertilizer application.
2. As chemical weed control measures apply Pretilachlor @ 0.75 kg/ha at 3 DAS followed by grubber at 30 DAS. For Hills Zone, application of Pretilachlor as pre-emergence weedicide @ 1.5 kg a.i./ha one day after sowing followed by two hand weedings at 35 and 50 days after sowing is recommended for rainfed upland rice.

Irrigation in aerobic rice:

In upland *ahu* rice, 5 cm irrigation should be applied in at 10-13 days interval.

Plant Protection Measures:

A) Insect Pests:

Plant protection measures should be adopted against insect pests at their economic threshold as given in Table 1.

To control rice pests, erect 50 'T'-perches per ha 2 ft (60 cm) above crop canopy as roosting site for insectivorous birds, which are to be removed before flowering in order to prevent activity of granivorous birds

B) Root-knot Nematodes: Apply *Pseudomonas fluorescens* @ 20 g/sq. m at the time of sowing.

C) Diseases:

i) Blast:

a) Grow tolerant varieties, such as Govind, Cauvery, IR 36

b) Treat the seeds as mentioned under seed treatment.

c) Monitoring of blast is important to schedule spraying. Observe the top five leaves and if 5% leaf area is damaged, resort to spraying. Normally three sprays can control the disease. Spray Hexaconazole 5EC @ 2g/lit of water at tillering stage (40-55 days after sowing) and subsequently give two more sprays of ediphenphos @ 1 ml/lit of water, one at panicle initiation stage and the other when the tip of the panicle just comes out.

ii) Sheath blight disease:

For control of sheath blight disease – spraying of two commercial plant-derived cymbopogon products *viz*. cymbopogon product 20EC @ 5 ml/lit and neem product @ 3 ml/lit is recommended for management of sheath blight disease of rice. The first spraying should be given as soon as symptoms of the disease are observed in the field followed by a second spraying at a 10 days interval.

iii) Bacterial leaf blight (BLB):

a) Grow tolerant varieties, such as Govind and IR 36.

b) Avoid top dressing with nitrogen at panicle initiation stage if BLB has already appeared. Instead top dress with 10 kg of K_2O /ha or apply 5 kg of K_2O/ha in the form of foliar spray of 3% solution.

iv) Brown spot disease:

Dry (2g/kg of seed) or wet (2 g/kg of seed/lit of water) seed treatment with carboxin followed by one spraying of or ediphenphos @ 1 ml/lit at initial symptom development stage.

v) Bakanae Disease:

a) Soak seeds for 24 hours with carboxin 2 g/kg seed/lit of water.

b) Rogue out the infected tillers (elongated, from the infected hills in the main field).

Pre-harvest Treatment on Standing Crop for Better Grain Quality:

Harvest of *ahu* crop usually coincides with rainy weather. Dis-colouration as well as sprouting of seeds in the panicle itself or after harvest is due to high moisture content of the seeds. To overcome such problems, spraying of diquat 0.05% or paraquat 0.1% or common salt (NaCl) 10% should be done on the earhead @ 1000 lit/ha in terms of chemical solution at 20-25 days after 50% flowering. These chemicals enhance the maturity by 5-7 days.

Table 1. Damage identification and Economic Threshold Levels (ETLs) for different insect pests of rice and their chemical control

Crop stage and damage identification	Key pest	ETL	Insecticide (Technical Name)	Dose
A. Nursery				
Curling of leaves, leaf blade rolls, yellowish to reddish Discolouration	Thrips	Moderate to severe	Imidacloprid 70WG Thiamethoxam 25WG	24.5 g *a.i.* /ha or 0.3 g/lit 25 g *a.i.*/ha or 0.03 g/lit
Yellowing and withering of plants	Leaf and plant hoppers	Moderate to severe	Imidacloprid 70WG Thiamethoxam 25WG	24.5 g *a.i.*/ha or 0.3 g/lit 25 g *a.i.*/ha or 0.03 g/lit
Presence of dead heart	Stem borer	Moderate to severe	Fipronil 5SC Chlorantraniliprole 20SC	50 g *a.i.*/ha or 1.5-2 ml/lit 30 g *a.i.*/ha
B. Main field (After transplantation)				
Upon unfolding, the edge of the central leaf shows discoloured (yellowish to whitish) Patches	Whorl maggot	More than 20% damaged hills upto 30 days after transplanting	Fipronil 5 SC	50 g *a.i.*/ha or 1.5-2 ml/lit
Leaf tissues scrapped in white parallel lines	Hispa	1 adult or 1 damaged leaf/hill	Lambda-cyhalothrin 5EC Emamectin benzoate 1.9EC	12.5 g *a.i.*/ha 8.08 g *a.i.*/ha
Presence of dead heart	Stem borer	1 egg mass/sq.m or 5% dead hearts	Fipronil 5 SC Chlorantraniliprole 18.5 SC	50 g *a.i.*/ha or 1.5-2 ml/lit 30 g *a.i.*/ha
Yellowing and withering of plants	Leaf and plant hoppers	10 insects/hill or 2 insects/hill in tungro endemic areas	Imidacloprid 70WG Thiamethoxam 25WG	24.5 g *a.i.*/ha or 0.3 g/lit 25 g *a.i.*/ha or 0.03 g/lit
Presence of silver shoots (galls)	Gall midge	1 silver shoot/ sq.m in endemic areas or 5% silver shoots in non endemic areas	Fipronil 5 SC Lambda-cyhalothrin 5EC	50 g *a.i.*/ha or 1.5-2 ml/lit 12.5 g *a.i.*/ha
C. Active tillering stage				
Presence of tubular case by cutting the tips of the leaves, leaf tissues scrapped in white patches	Case worm	1-2 cases/hill	Chlorantraniliprole 18.5SC	30 g *a.i.*/ha
Leaves are folded along margins by webbing them together	Leaf folder	More than 1 damaged leaf per hill	Fipronil 5SC Chlorantraniliprole 18.5SC	50 g *a.i.*/ha or 1.5-2 ml/lit 30 g *a.i.*/ha

Presence of silver shoots (galls)	Gall midge	1 silver shoot/sq.m. in endemic areas or 5% silver shoot in non-endemic areas	Fipronil 5SC Lambda-cyhalothrin 5EC	50 g *a.i.*/ha or 1.5-2 ml/lit 12.5 g *a.i.*/ha
Leaf tissues scrapped in white parallel lines	Hispa	1 adult or 1-2 damaged leaves per hill	Lambda-cyhalothrin 5EC Emamectin benzoate 1.9EC	12.5 g *a.i.*/ha 8.08 g *a.i.*/ha
Presence of dead heart	Stem borer	More than 5% dead heart	Fipronil 5 SC Chlorantraniliprole 18.5SC	50 g *a.i.*/ha or 1.5-2 ml/lit 30 g *a.i.*/ha
D. Boot leaf to heading stage				
Presence of partially or completely chaffy grains in the panicle	Rice bug	1-2 bugs/sq.m	NSKE 1500 ppm	3-5 ml/lit
Presence of white Earhead	Stem borer	1 moth/sq.m.	Fipronil 5 SC Chlorantraniliprole 18.5SC	50 g *a.i.* /ha or 1.5-2 ml/lit 30 g *a.i.*/ha
Larvae climb and cut the earhead	Ear cutting caterpillar	1 larva/hill	Fipronil 5 SC Chlorantraniliprole 18.5SC	50 g *a.i.*/ha or 1.5-2 ml/lit 30 g *a.i.*/ha
Presence of shed grains or panicles at the base of the plant	Climbing cutworm	1 larva/hill	Fipronil 5 SC Chlorantraniliprole 18.5SC	50 g *a.i.*/ha or 1.5-2 ml/lit 30 g *a.i.*/ha